



Sarina Abrishamcar

Ph.D. Student, Epidemiology
 First Year ARCS Scholar
 Northside Hospital Award



EMORY
 UNIVERSITY

The joint effects of prenatal exposure to environmental toxins and psychosocial stress on child cognition in a low and middle-income setting

Pregnancy is a critical time window for neurodevelopment and a time when the fetus is most susceptible to adverse environmental and prenatal exposures. I am investigating the impact of prenatal environmental and psychosocial stressors on child cognition through epigenetic changes, in a South African birth cohort.

Environmental Exposures and Child Cognitive Development in Low and Middle-Income (LMIC) Countries

Prevalence of delayed cognitive development in LMICs can be as high as 60%

Psychosocial stressors have been associated with increased child behavioral problems

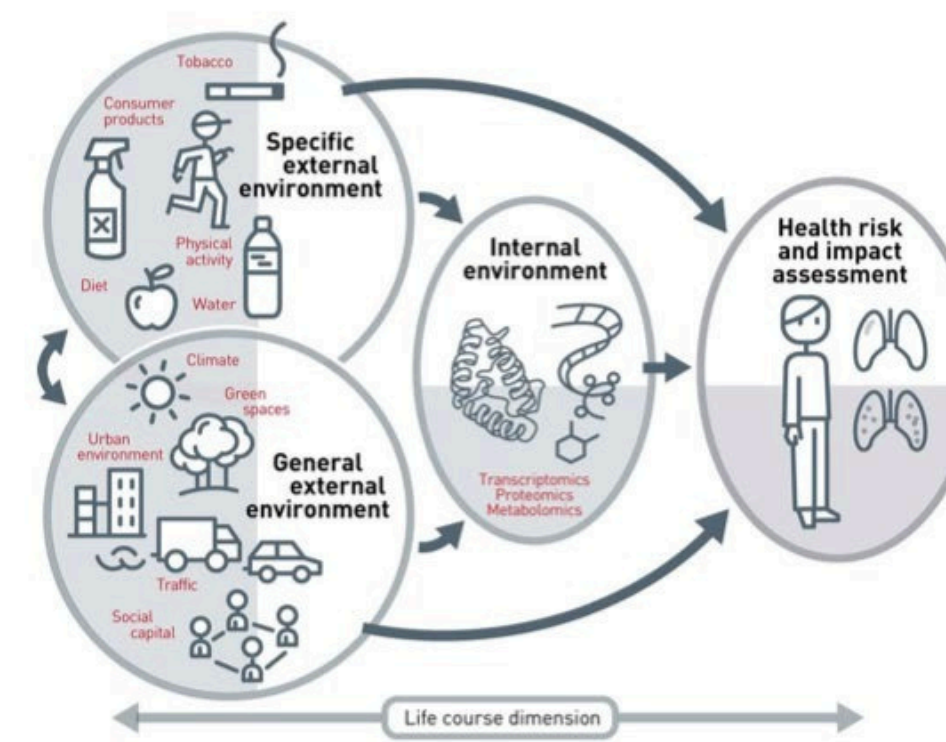


Environmental toxicants have been associated with Autism Spectrum Disorder



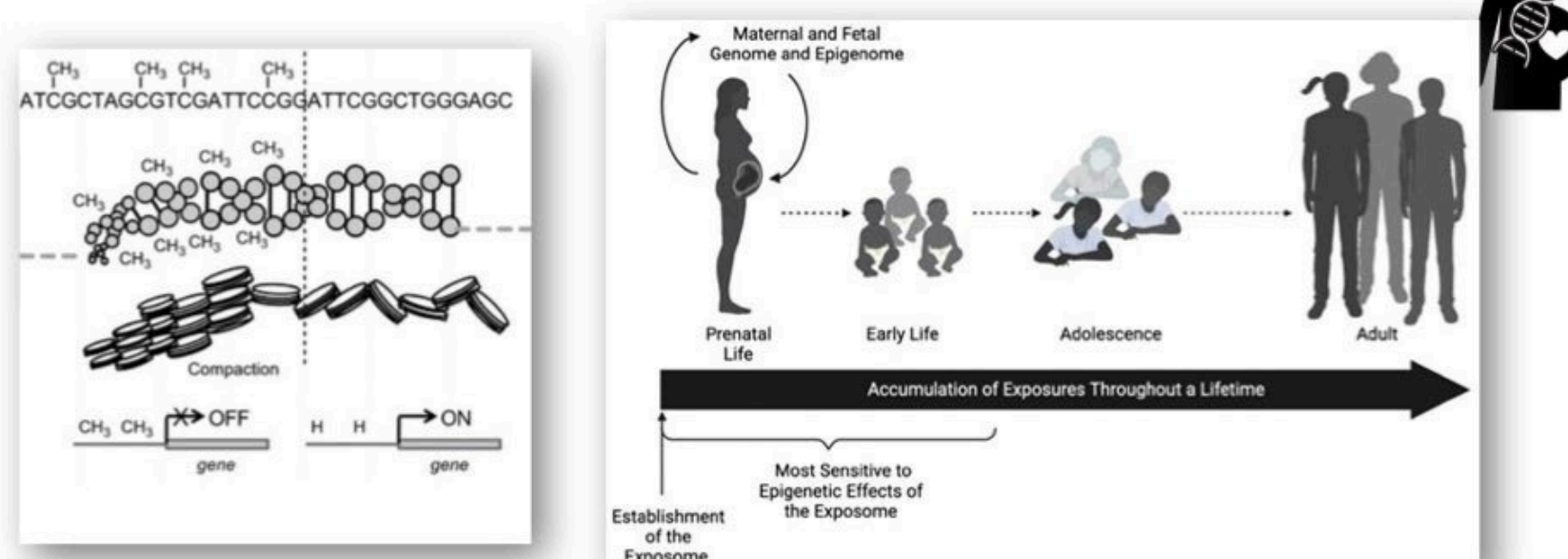
Black et al., *The Lancet* (2013); Grantham-McGregor et al., *The Lancet* (2007)

The Exposome: “the footprint of a lifetime of exposures”



Vrijheid, *Thorax* (2014)

Epigenetics and the Developing Brain



Culmination of environmental exposures leaves a unique epigenetic signature which affects how genes are turned on or off

Colwell et al., *Exposome* (2023)

Research Gap

- 1) What is the impact of exposure to both psychosocial stressors & environmental toxicants?
- 2) What are the underlying biological mechanisms?
- 3) How are low-income communities specifically impacted?

My Research Questions

1) Does the risk of child neurocognitive and behavioral problems increase when prenatally exposed to both high levels of psychosocial stress and environmental toxins in a South African birth cohort?

2) Does this combined exposure affect child behavioral development in part through epigenetic changes (DNA methylation)?



Potential Research Impact

Advance	Identify	Promote
Advance our understanding of how external environmental factors interact during a sensitive time window of child development	Identify biological mechanisms that may provide evidence for causal plausibility	Promote environmental justice initiatives to help reduce global health disparities

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